ELLIOT Project Presentation #4

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SEVENTH FRAMEWORK PROGRAMME

Experiential Living Lab for the Internet Of Things

D6.3.4 - Project Presentation #4 (M32)

Deliverable data

Deliverable no & name	**D6.3.4 - Project Presentation #4 (M32)**
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Short Description	*The fourth and final version of the Project Public presentation is provided in this deliverable. Its aim is to serve for facilitating the dissemination efforts of all consortium partners, by providing common background information on the project objectives and expected results.*
Deliverable Nature	*Report/Prototype/Demonstration/Other*
Dissemination level	**PU** Public **X** **PP** Restricted to other programme participants (including the Commission Services) **RE** Restricted to a group specified by the consortium (including the Commission Services) **CO** Confidential, only for members of the consortium (including the Commission Services)
Date	*30-04-2013*
Status	*Final*

Document history

Version	Date	Author /Reviewer	Description
1.0	30-04-2013	Marco Conte	Final release

Table of Contents

1 Executive Summary

This deliverable includes the final version of the project public presentation.

The objective of this presentation is to harmonise ELLIOT concepts, objectives and outcomes to be disseminated to the wider public, at scientific, industrial and citizen's level, in order to facilitate the dissemination effort from all partners. It is however suggested that a specific tailoring (in order to accommodate for the specific needs of a specific target group) to be more effective.

The project presentation was intended to be a dynamic document, and was periodically evolved in order to include the latest project developments and findings.

2 Introduction

2.1 Purpose and Intended Audience

This deliverable includes the 4th version of the ELLIOT project presentation, which is a public document suitable for supporting the dissemination activities of all partners towards all the interested target groups for ELLIOT. These consist of:

- Scientific community, working in the Internet of Things domain;
- The community of Living Labs, both at single Living Lab level, by leveraging their users' and citizens' communities and relevant communication means, as well as at ENoLL level.
- Multipliers, which are Social and Economic external entities that are (because of their social mission and/or business positioning) potentially committed to the adoption of results, and/or in a position of reaching a large dissemination target and/or in a position of playing an active role in supporting the achievement of the project impact.
- ELLIOT stakeholders, at both EC and National levels.

2.2 Applicable Documents

AD(1). EC Communication Guidelines for Projects
http://cordis.europa.eu/fp7/ict/participating/communication-best-practices_en.html

AD(2). ELLIOT DOW

3 ELLIOT Public Presentation # 4

Experiential Living Lab for the Internet Of Things

ELLIOT
Experiential Living Labs for the Internet Of Things

EU FP7 STREP 258666
Duration 1.9.2010 – 30.06.2013
Standard Presentation

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ELLIOT Partnership and Roles (1)

Polymedia s.p.a., Italy	Polymedia	**ICT vendor & integrator, specialized in Media & Channel Integration**
The University of Nottingham, UK	The University of Nottingham	**Four leading research organisations from 3 European Union Country, involved in user centric and open innovation research topics**
BIBA – Bremer Institut für Produktion und Logistik GmbH, Germany	BIBA - Bremer Institut für Produktion und Logistik GmbH	
INRIA – Institut National de Recherche en Informatique et Automatique, France	Inria INVENTORS FOR THE DIGITAL WORLD	
The University of Reading, UK, IMSS Laboratories	imss University of Reading	
Collaborative Engineering, Italy	Collaborative Engineering	**Open Innovation and Living Labs Best Practices**

1

ELLIOT Partnership and Roles (2)

Logistic Pilot: Design and Use of Intelligent Product Applications in an IoT environment

BIBA

BIBA - Bremer Institut für Produktion und Logistik GmbH

Wellbeing Pilot: e-Services for Life and Health

FSR Fondazione Centro San Raffaele

Green Services Pilot: mobile and fixed sensors to improve transports. health & well being

Fing, Inria, VU Log

Six different pilot scenarios for demonstrating ELLIOT results

Healthcare Pilot: Remote assistance for Cardio Patients

VirTech

Retail Pilot: IoT enabled smart shopping scenario

SafePay systems

Energy Efficient Pilot: Managing energy for buildings and offices

intersoft

InterSoft, a.s.
Košice, Slovakia

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Involving Users and Citizens in the definition and testing of innovative IoT services

Background

Strong and growing emphasis on the involvement of the final users in the development process of new product and services, especially in the IoT domain

The need

Definition of new industrial Practices to get the product or the services right from the beginning

How

To put potential customers, users and citizens in a position to feel, sense, experiment and interact with new services/products under development since the early stage of its conception.

Why

- Reduction of the development cycles needed to engineer and make available to the public the intended product/service
- Products/services better in line with customers' true needs (produce what it is really needed rather than to produce what it is feasible)

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ELLIOT Results

KSB User eXperience (UX) Model
A model to design and make sense of the User eXperience when adopting and co-creating IoT based services. Horizontal applicability in the IoT based service Domain.

ICT Experiential Platform
A platform based on the KSB UX Model, operating as a knowledge and experience-gathering environment in the IoT context, to explore socially enabled ICT/IoT, including its validation and the relevant impact evaluation

Business Cases of Elliot instances in six different Living Labs
Acquired success factors and lessons learnt from six different sectors, namely Logistics, Wellbeing, Environment, Retail, Energy and Healthcare, to validate the identified UX approach.

User Experience Based Design Roadmap
A proposed research agenda, to provide concrete research and implementation suggestions in order to overcome the gaps still existing and to facilitate the fully uptake of the UX in the IoT domain.

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ELLIOT Results

KSB User eXperience (UX) Model

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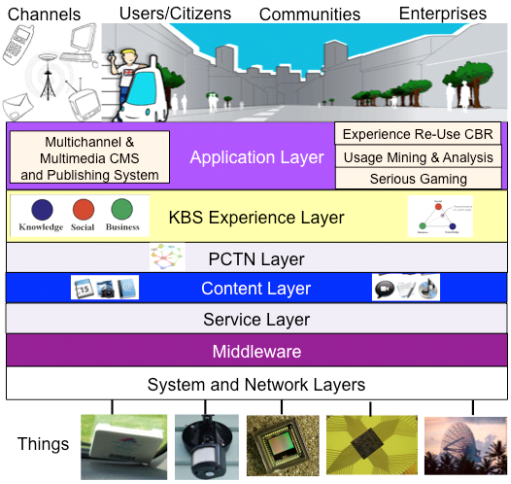
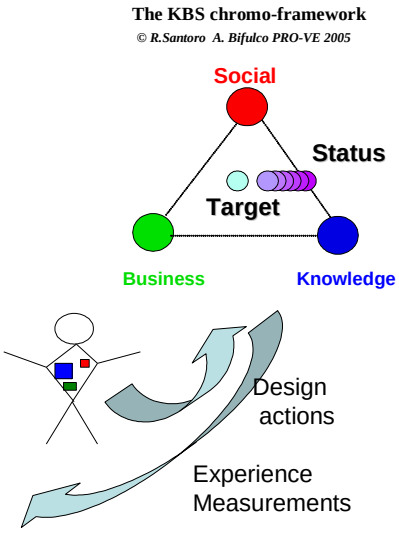
KSB Experiential Based IoT Solutions Co-Creation





ELLIOT KBS Model

The KSB Holistic User eXperience (UX) Model is broken down into 3 different but complementary sub-models corresponding to each of the 3 perspectives or dimensions, namely:

- Knowledge sub-model,
- Social sub-model and
- Business sub-model.

A set of experience types is included in each of the 3 KSB perspectives.

For each experience type, there is a set of elements that need to be taken into consideration for describing the corresponding 3 sub-models.

All the model elements will get into a top-down/bottom-up confrontation between structural and conceptual approach and use case scenarios in order to make sure that each use case will have the necessary model elements in the final KSB Holistic UX Model. The integration of the three sub-models forms the complete holistic model that is implemented in the Experiential Platform and instantiated for each use case scenario.

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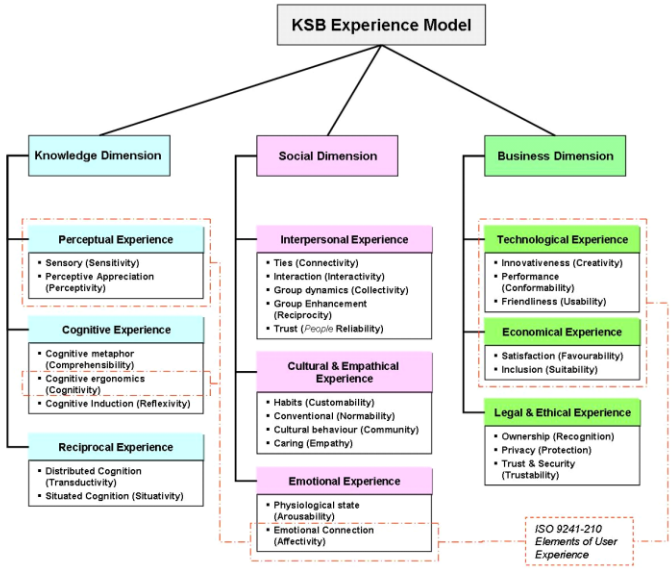
ELLIOT KBS Model



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ELLIOT Results

ICT Experiential Platform

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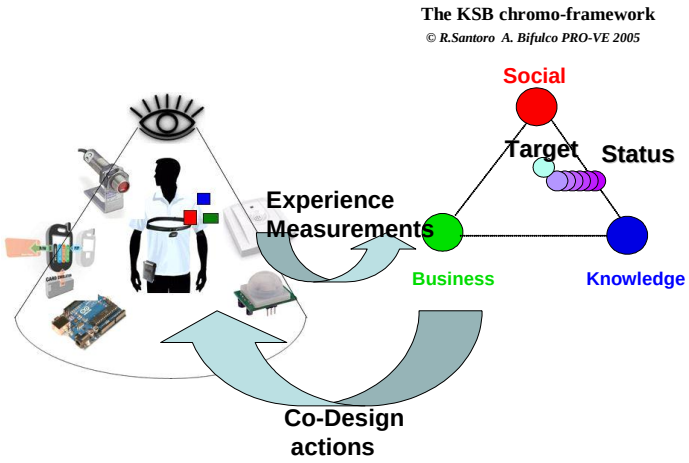
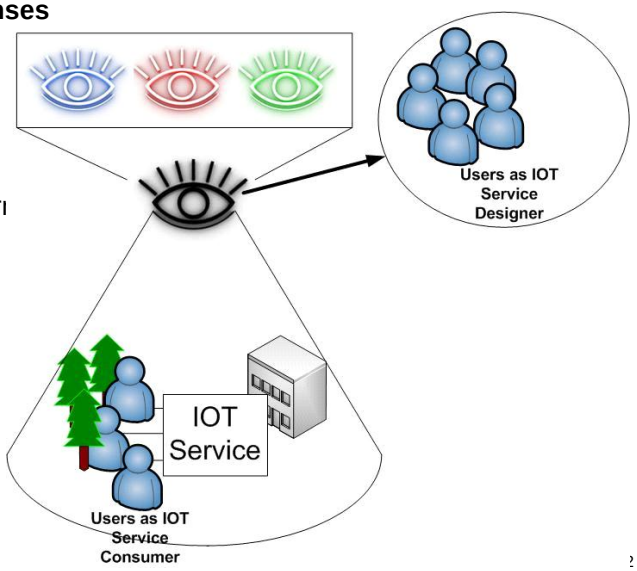
A New Way to Look at the Experience



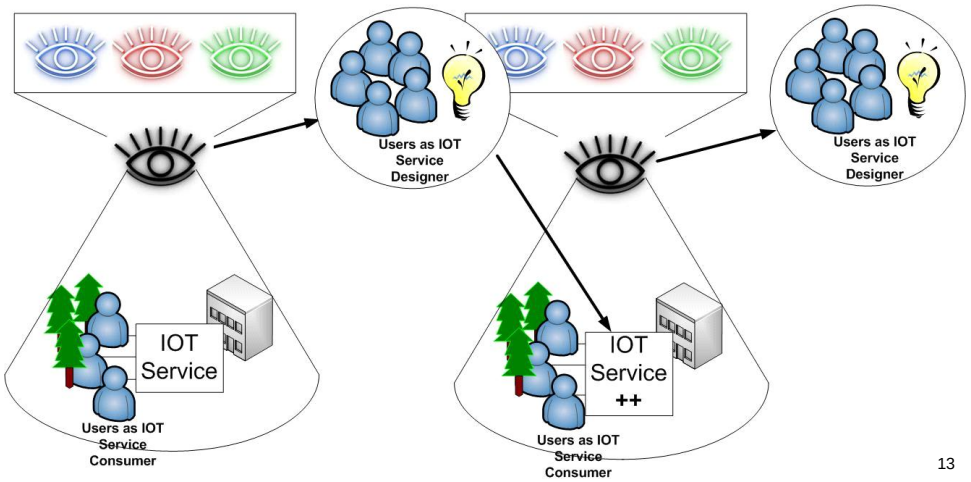
The ELLIOT Platform Feedback

- An **Eye** with three **lenses**
  - **Knowledge**
  - **Social**
  - **Business**
- The observation returi a **feedback** to the **Designers**



Service Improvement and new Iteration

- ELLIOT supports the LL **co-creation** (CoPa, Serious Gaming)
- At the time the **Living Lab improves the service,** a new **observation** starts



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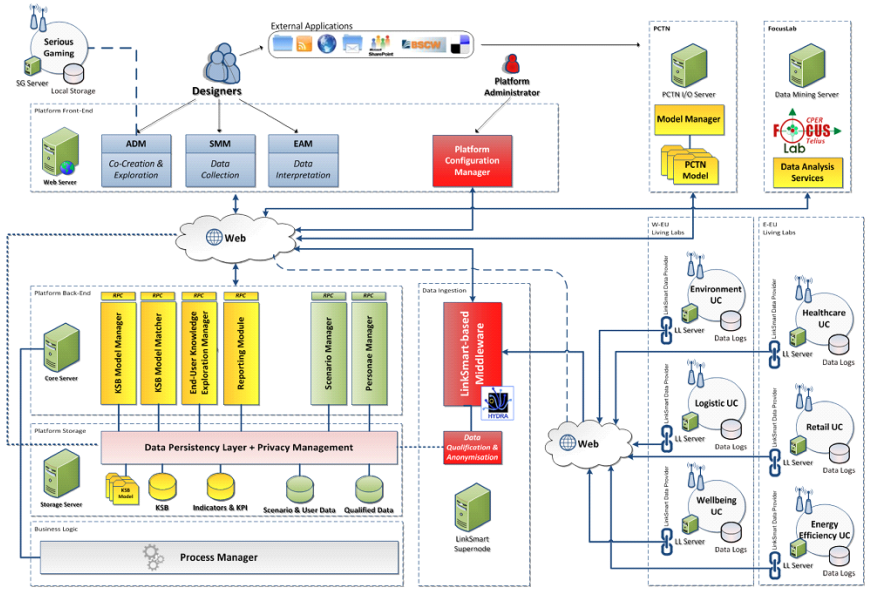
ELLIOT Platform Architecture Overview



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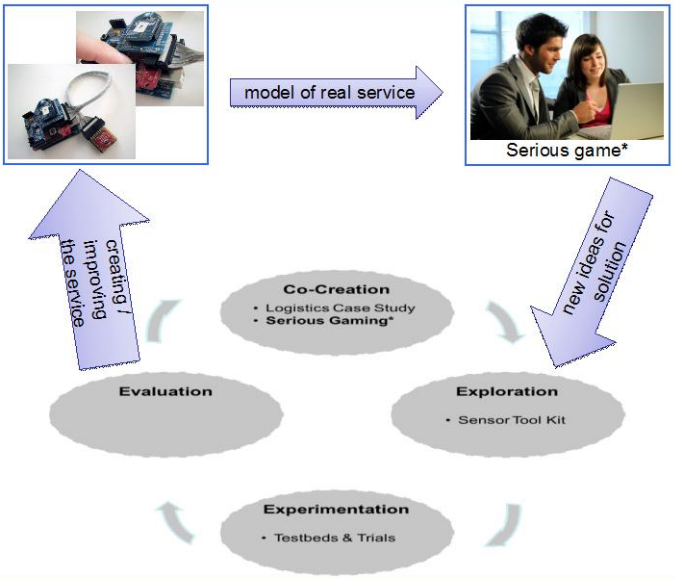
ELLIOT Platform Architecture Components

- Data Analysis Services based on new advanced web services of FocusLab server, used for mining IoT data streams and clustering users profiles and usage/UX data
- A PCTN component visualising the runtime interactions between People, Computers and “Things”
- A Platform Configuration Manager (for ELLIOT Advanced Users)
- A Presentation Layer – Front-End/GUI – for Service Designers
- Serious Gaming component
- A CORE platform block, responsible for the provision of the services necessary to manage the internal platform process and the connection with the other components
- A Data Layer, responsible for the management of the data of the platform including services for accessing it
- A middleware based on LinkSmart, used for data ingestion from the Living Labs and for the performance of anonymization and qualification tasks

EU FP7 STREP 258666 15

Serious Game: A tool to support the LL



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ELLIOT Results

Business Cases of Elliot instances in six different Living Labs

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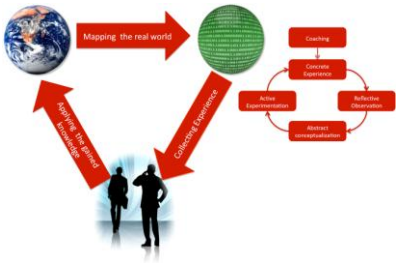
ELLIOT Pilots

- To explore the potential of **user co-creation techniques and tools**, such as serious gaming, participative requirements engineering and verification / validation, in the context of IoT.



- Experiment within **six European Living Labs**, each composed of a physical space artifact, an information space architecture and a societal space community, in six different sectors, namely **Logistics, Wellbeing, Environment, Retail, Energy** and **Healthcare**. They allowed to explore and validate the KSB Experience Model, the Experiential Platform as well as the co-creation techniques and tools in the context of IOT technologies and services.

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ELLIOT and the Living Lab Pilots

The ELLIOT Experiential approach was explored and experimented within six different use cases (Living Labs) belonging to different sectors, namely Wellbeing, Logistics, Environment, Healthcare, Energy Efficiency and Retail shopping, to validate the capability of users/citizens to co-create IoT based services.

- **e-Services for Life and Health** at the S. Raffaele Hospital, Italy;
- **Design and Use of Intelligent Product Applications** in an IoT environment in Germany, addressing safety and security issues in Intra-Logistics;
- **Green Services** in France, where a flow of environmental data is collected from various **mobile** ("citizen mobile sensors", "city green electric vehicles" and green watches) and **fixed** sensors (city devices, sensors on inhabitants' balconies);
- **The Remote Assistance for Cardio-Patients** case in Bulgaria, based on an intelligent IoT platform to provide medical services to patients remotely from a Medical centre;
- **The Energy Efficiency scenario** in Slovakia, aimed at implementing the energy efficiency, goal-driven, intelligent application of a Smart Office;
- **The Retail use-case** in Hungary, to operate an intelligent shopping environment, where user friendly customer experience is achieved using IoT technologies – RFID, barcode, NFC – on personal information terminals.

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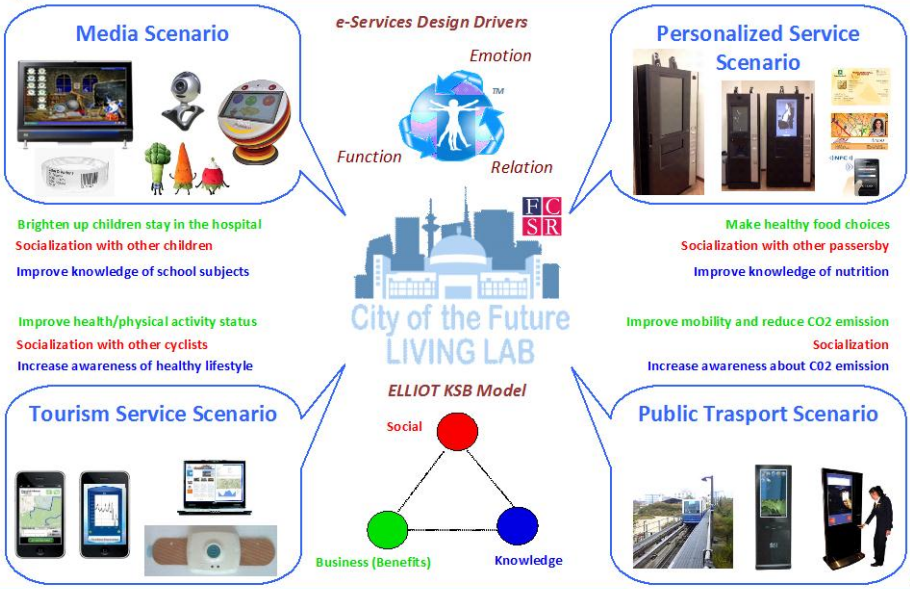
City of the Future Use Case



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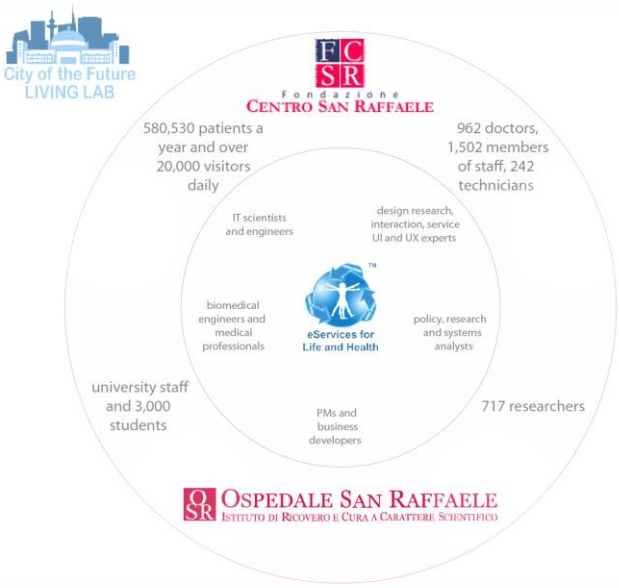
City of the Future LL community

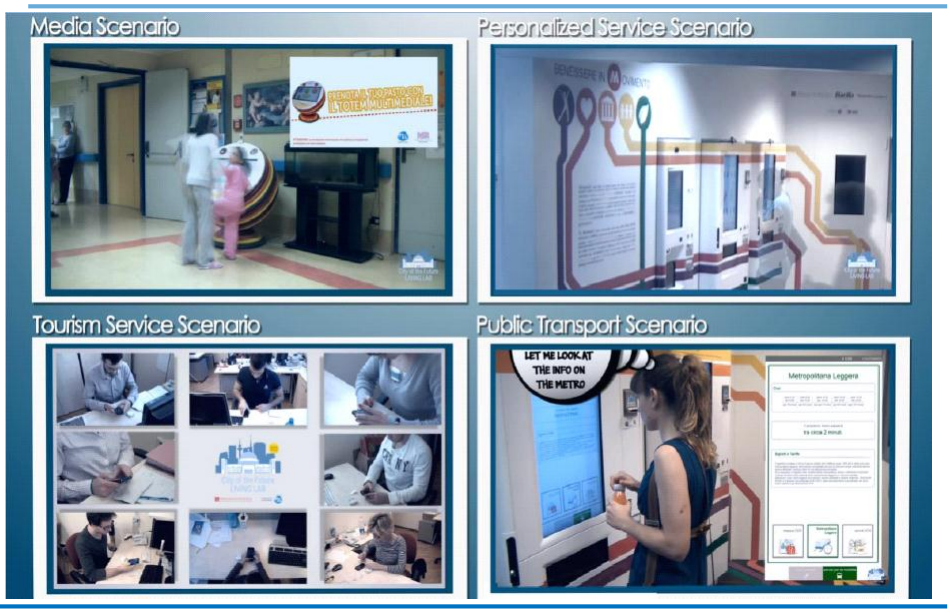


City of the Future Living Lab Cycle

City of the Future LL: Co-Creation

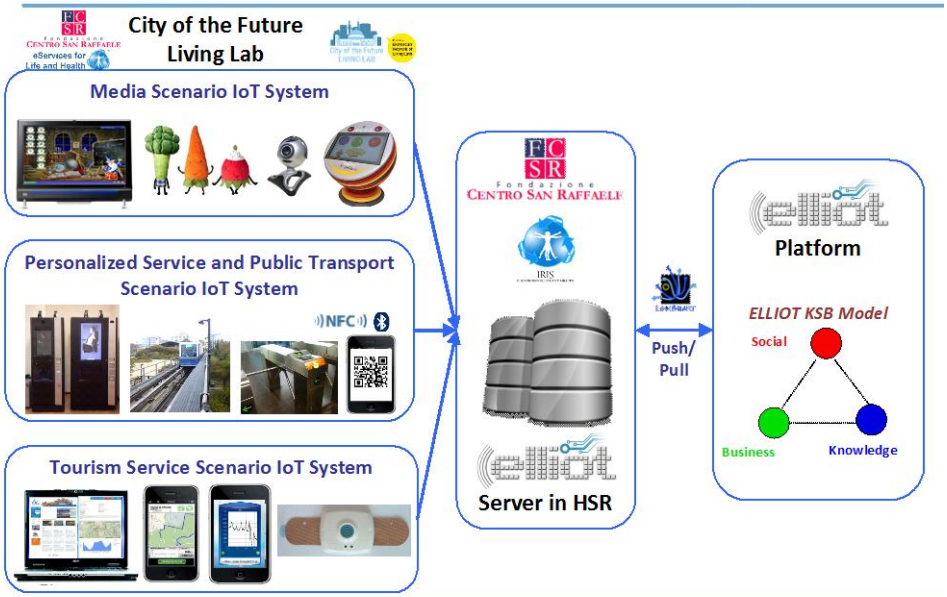
City of the Future LL: Exploration

City of the Future LL: Experimentation

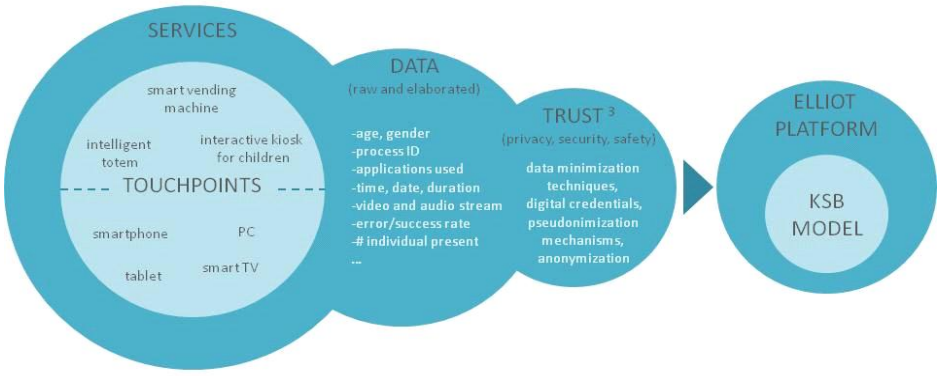


City of the Future LL: Experimentation

City of the Future LL: Evaluation



City of the Future LL: Data Sending and Privacy Issues



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ELLIOT Pilot Exploitation
Services developed thanks to ELLIOT

Scenario	K	S	B
Media Scenario	Knowledge and awareness about the interaction with medical staff and environment. Knowledge about food during meal ordering	Interaction between young patients thanks to games	Young patients focused meal ordering, gaming and leisure services
Tourism Service Scenario	Knowledge and awareness about body performances in daily activities	Information sharing between users and clinicians	Smartphone app and web portal connection
Personalized Service Scenario & Public Transport Scenario	Knowledge and awareness about nutrition	Socialization during relax time and coffee break	Better (healthier) food choices

ELLIOT Pilot Exploitation
Services improved thanks to ELLIOT

Scenario	K	S	B
Media Scenario	Educational games focused per ages	Multi-user capable games	New user graphic interface for young patients
Tourism Service Scenario	Add-ons on smart-phone app for easy information access	Friendship system	Add-ons on smart-phone app and new stand-alone modality for intense sports
Personalized Service Scenario & Public Transport Scenario	New mode for information communication	-	New user interface for vending-user efficient interaction

ELLIOT Pilot Exploitation
Characterisation of users involvement in the Pilot

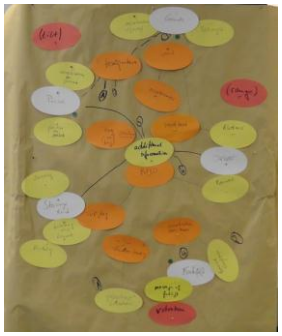
Scenario	How	User categories	Feedback
Media	interactive totem in OSR's pediatric department (LL duration: 12 months)	Young pediatric patients	Data logging on user activity and head counting
Tourism	3 day using experience with wearable device, smart-phone, app and web portal account (LL duration: 2 months)	Volunteers from Living Lab	Questionnaire and data logging
Personalized Service Scenario & Public Transport Scenario	Automatic temporary store (LL duration: from july 2012, still running)	Living Lab attending (visitors, patients, clinicians, employees,…)	Data logging on user activity and chosen products and IoT.

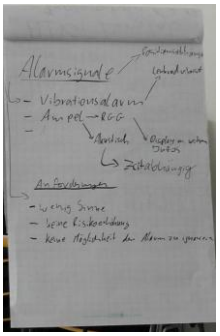
The Logistic Case: Introduction

- In nowadays transportation complexity sensitive goods involve high risks of loss in case of damage
- BIBA is developing a service to unveil risky situations
- Users and potential clients are being integrated to *co-create* IoT services for intra-logistic environments
  - **Affected person implements counter activity themselves!**

Co-Creation

- Co-Creation is indispensable for this application case





Participants *co-create*

- ideas of new concepts,
- innovative scenarios through collective creativity, and
- all concerned stakeholders, esp. users are involved.

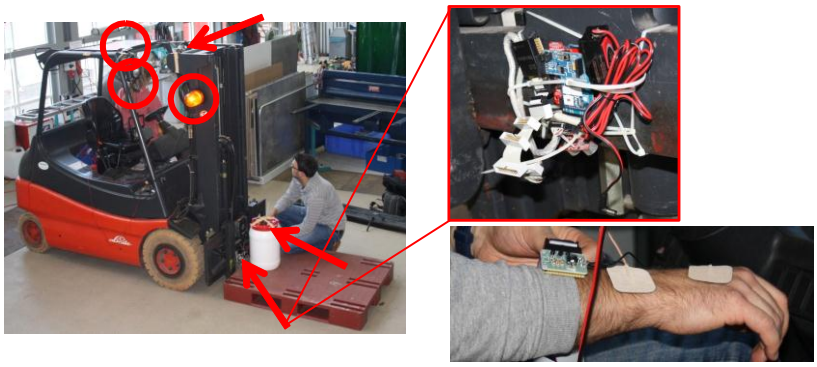
Exploration

- Participants explore technology (IoT) and alternative scenarios
- Use of immersive techniques within a live environment

- Supported by demonstration artefacts (forklift, pallets etc.)
- Concluded by an improved service draft

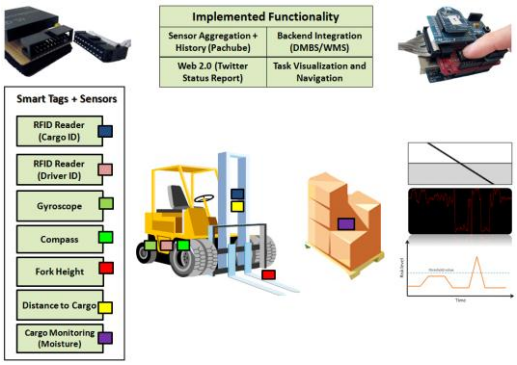
Experimentation

- Transfer of co-creation and exploration results
  - Improved service draft transferred into real life environment
- Prototyping of concrete applications / services
- Use of technological platform within a live environment



IoT Toolkit: Improving the IoT Experience

- Sensor toolkit with GUI for use in *Exploration and Experimentation*
- Users are able to configure a service and to create risk logics
- The toolkit contains:
  - Distributed wireless sensors, attached to logistics objects (good, pallets, forklifts, etc.) and workers.
  - Actuators are provided to personnel, namely the forklift driver (attached to the forklift, usually inside the driver's cabin).
  - Furthermore the toolkit is Internet enabled (e.g. twitter, E-Mail)



Evaluation – KSB model

- ELLIOT KSB model used to measure the User Experience

Knowledge Services	Social Services	Business Services
• Learning and understanding about risk situations (*Cognitive Artefacts*)	• The measure of the *Attractiveness* of the services will answer the question whether the provided solution is as business / professional oriented as expected.	• The solution should be constantly used (*Ergonomic Quality*) and therefore reduce the number of damages (*Performance Level*) and accidents and provide the necessary and requested information wherever users are - considering data privacy (*Accessibility*)

Results

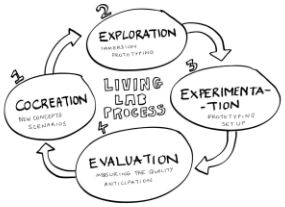
- Within the ELLIOT Living Lab @ BIBA and BIBA‘s IoT toolkit two core IoT services were developed:

- A **transport condition surveillance** service for specialized fields of application like valuable goods (e.g. unique and rare items, items of high value etc.)
- A **forklift surveillance** service which observes risks for goods, personnel and equipment (context depended), including an RFID based surveillance optimization (RFID tags or data bases influence the adjustment/function of the service accordingly)

Green Services Use Case: Introduction

Our use case has been created with citizen's involvement through the different steps of the creation process (co-creation, exploration, experimentation)

It aims to support both the health & well-being and mobility scenarios.



Knowledge
- Increase awreness on IoT paradigm
- Update knowledge on the impact of air quality in daily lives

Social
- Generate enthusiasm for IoT based services
- Improve interest for air quality measurement
- Provide trustful services
- Foster citizen involvement in air quality measurement
- Encourage collaborative tagging and information sharing

Business
- Provide robust, relevant and customised environmental information
- Provide easy to use and engaging green services
- Change citizen behaviour towards a more sustainable lifestyle
- Respect citizen privacy and confidentiality

ICT USAGE Lab — Inria INVENTEURS DU MONDE NUMÉRIQUE — fing — VULOG

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ICT Usage Living Lab process

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User's involvement : co-creation

Co-creation workshops on two topics : mobility and health.

The aim of these co-creation activitites was to create green services using methods of co-creation (play : Aloha! and place : GenIoT) instead of classic brainstorming sessions.

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User's involvement : exploration

European mobility week 2012

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User's involvement : experimentation

1 experiment with a gummy green watch

Participants were offered a dummy green watch and were asked to wear it and report about its usage daily. Participants were told that the watch would geo-locate them and would indicate selected information on their environment.

Every day, they received an email reminder asking them to fill out the same questionnaire regarding their usage of the watch. Individual interviews in order to debrief and qualify the data gathered were held at the end of the experimentation.

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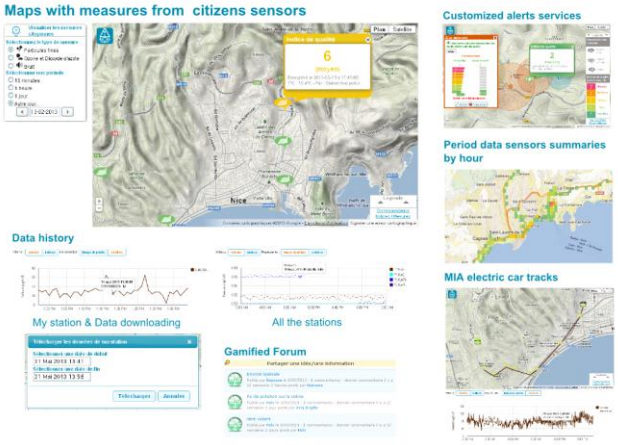
Development of *MyGreenServices*

MyGreenServices supports three roles of users.

Citizen/professionals (data producers or consumers)



MyGreenServices is a community environmental open data platform which provides to citizens green services based on air quality and noise measures supplied by data from citizens sensors (fix and mobile) + 1 MIA electric car from Nice-Cote d'Azur

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IoT data from Sensors and devices

1. Micro particules PM10



2. Ozone+NO2



Citizen mobile devices (Azimut device increased with localisation)

3. Ozone, NO2

Nice City mobile device: 1 MIA electric car from Nice-Cote d'Azur equipped by VULOG (Azimut device)

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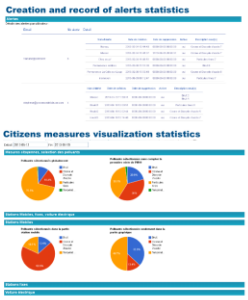
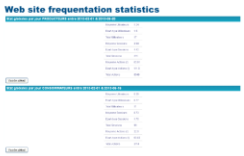
Development of *MyGreenServices*

For living lab managers





MyGreenServices offers a statistical tool for analysing user sessions on the portal via logs.

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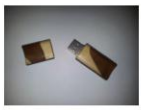
MyGreenServices experimentation

- 2 experiments with two versions of MyGreenServices
- Experiment 1 (February 2013, 16 days) user feedback was captured in order to improve the first version
- Experiment 2 (June 2013, 16 days)
- ELLIOT Citizen Prices, June 18th 2013



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Services developed thanks to ELLIOT

K Services

- Improvement of ideation methods (GenIoT and Aloha!).
- Improvement of the diary method and of the longitudinal study
- Interactive map with real-time measures from citizens sensors
- Real-time and geolocate customized alerts service
- Data history download (Chart and map interactions)
- Improvement of MIA electric car tracks

S Services

- Gamified forum
- Improvement of Ideastream platform
- Possibility to share posting forum messages on facebook

B Services

- Support for decision making (time for sports, aeration of my apartment, ..)
- Real-time alerts by email and SMS for decision
- Reinforcement of data reliability/security

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Services improved thanks to ELLIOT

K Services

- Analyze results of the first experimentation to improve the second
- More access: Possibility to view all the stations
- Improvement of the interfaces: unification of menus
- Assessment by participant/station
- Computing polluant summaries for the 24 hours of the experiment periods

B Services

- Prototype a new "low cost" sensor platform.
  tested in the second experimentation.

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Evaluation

Use of
a) ELLIOT KSB model
b) an hybrid approach based on heterogeneous data
and advanced Data Analysis Services of FocusLab server
to measure the User Experience

Knowledge Services	Social Services	Business Services
• Learning and understanding about behaviour change (*Cognitive Artefacts*)	• Create an interest about air quality and pollution in the community of users (collective intelligence)	• The solution should be user friendly (*Ergonomic Quality*) and providing reliable data (Reliability) taking care of personal data (Data protection)

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Users Involvement: results

How were the users involved

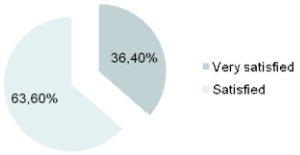
Some of them were previously involved in the green services co-creation process. The others were recruited at the time of first experimentation.

Categories of users

Two categories of users : producers [were holding (Azimut) or hosting (Pollux or AxISbox) an IoT device] and consumers. Both of them were invited to :

- use *MyGreenServices* portal checking measures
- fulfill questionnaires sent directly by *MyGreenServices* portal.
- contribute to the gamified forum for exchanging ideas about usage of the open data.

Feedback from Users



The overall level of satisfaction is **high**.

Many have expressed their willingness to continue beyond experimentation and identified new participants for future experiments.

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Results

Within the ELLIOT Living Lab @ ICT Usage Lab, various methodological elements and IoT based services were developed:

1.Co-creation step: two Ideation methods (and their toolkits) for IoT based services

2. UX measurement:

- A hybrid approach (qualitative and quantitative data, questionnaires, logs, IoT data) for instantiating the KSB model and mapping it with indicators in the Environnement & Open data
- Implementation and application of some advanced web services of mining IoT Data or evolutive data for enriching qualified data or/and computing new indicators;

4. **Green Services:** development of a collaborative environmental open data platform called *MyGreenServices* including a gamified forum
5. **IoT:** AxIS box, a prototype of “low cost” sensors made with Arduino and manufactured by AxIS@Inria engineers.

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Lessons Learnt

Success factors

Considering the aim of the experimentation who was to assess the user experience and experiential learning related to *MyGreeenServices*; including experience related to the IoT devices, to the measures and services as well as air quality awareness and behaviour changes monitoring,

after two experiments of 16 days in Fevruary and June, participants were aware of air quality awareness. The awareness can be considered as a first step in the behavior changing process. *MyGreenServices* help in the validation of their fears. In the end, we have a community of around 35 active contributors (citizen/ professionals, co-creators/data producers) who can exchange over these questions on our forum.

Challenges

The pilot can be seen as a pre-test. Feedbacks from the users (quantitative and qualitative data) helped to improve the service and also to create new services in the second version. The second experiment confirms the first main results in terms of user experience and the improvement of the second version of *MyGreenServices*.

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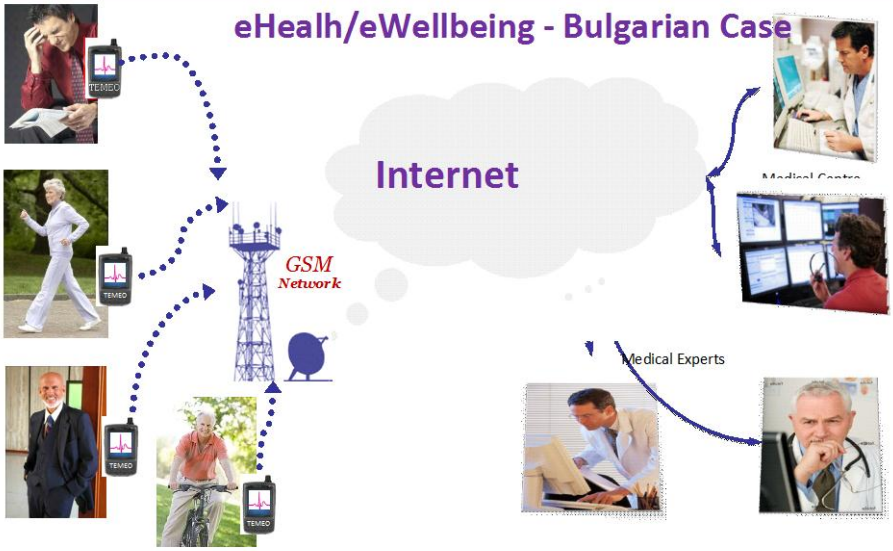
eHealth/eWellbeing Pilot in Bulgaria: Introduction



IoT Advancement v KSB Model
Services developed and improved thanks to ELLIOT (1)

- Mobile technology applications (smartphones, tablets) – new services;
- Medical data centre – substantial improvement and development in terms of functionality, scalability, upgraded with cloud computing based services;
- Adaptive data analytic system, first pilots for medical analytics services - new services;
- Geo-location based services - new services;
- Customizable user interfaces, multiple levels of adaptation and user's interactions - substantial improvement, based on User Experience evaluation and mobile apps.
- Flexible medical structure including geographic distribution, outsourced activities and etc. (new functionality)
- Ability to support a huge number of devices and device's types - substantial improvement in scalability and areas of applications outside eHealth applications.

IoT Advancement v KSB Model
Services developed and improved thanks to ELLIOT (2)

- Live 24/7 monitoring - substantial improvement: development of new embedded initial diagnostics (reaction in few seconds and reaching over 80% success cases), graphical interface, and new opening new communication channels (e.g. mobile devices).
- All-in-one monitor for patient's medical parameters – new integrated system supporting telemedicine services.
- Role-based security system and detail logs for user's activities – updated security standards applied, extended functionality.
- Powerful hint system – new functionality supporting both doctors and users.
- Knowledge sharing center - new functionality supporting both doctors and users.
- Web services for communication with external medical system and knowledge bases - new functionality supporting doctors, including opportunity for local and global healthcare analytics.
- Piloting multilingual and semantic based services, e.g in designing a joint pilot with HSR Milan – new functionality based on Atlas technologies: http://www.atlasproject.eu/. See also the demo web site of the World Health Organization - http://asset.atlasproject.eu/who.

IoT Advancement v KSB Model
Services improved thanks to ELLIOT - examples

K dimension of the Services

- Development of an Android Patient App for connection with MD;
- Use of OS Adroid phone with a “panic” buttons calling the doctor or MC

S dimension of the Services

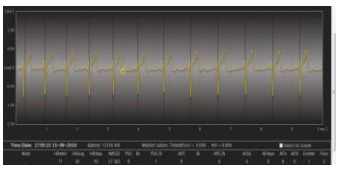
- zooming of ECG:
  - entire graphics;
  - detailed part of it.

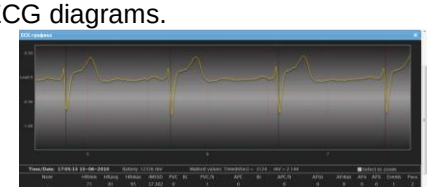
B dimension of the Services

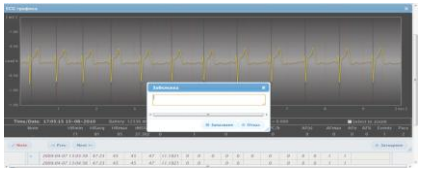
- epoch monitoring – filtering the epoch with events

Living Lab and KSB model

- co-creation and exploration;
  - Two features very important for the doctors co-created with users:
    - Zooming of ECG graphics – entire graphics and part of it;
    - write a notes over the ECG diagrams.







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ELLIOT eHealth/ eWellbeing Pilot. CHARACTERISATION OF USERS' INVOLVEMENT IN THE PILOT

- **Way of involving the users**:
  - Data gathering
  - Advise from the users and stakeholders;
- **Categories of users**:

Two basic categories of Users with opposite roles, aptitudes and responsibilities:

  - **Patients**:
    - patients with cardio problems;
    - patients – for preventive tests.
  - **Medical staff:**
    - Doctors;
    - Nurses and other medical staff, working in the MC.
- **Feedback from them**:
  - Data gathering;
  - Interviews;
  - Increasing the number of requests to use the platform: more for preventive tests.

eHealth/ eWellbeing Pilot. LESSONS LEARNT

Success factors

- After implementing the continuously medical monitoring – few people in risk were rescuing.

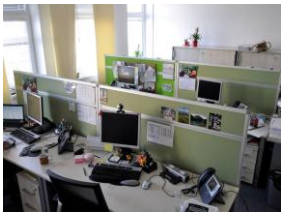
Challenges *(at different stages)*

- Development stage:
  - To further formalize doctors' needs.
- Implementation / exploitation stage:
  - Measures to motivate / engage the doctors / patients to use the services
- Identification of KSB -> KPI stage:
  - To identify the specific KSB and KPI which cover the main goal – trust in the services

Energy Efficient Office use case

Targets:

- Achieve a positive impact on environment by reducing the energy consumption and CO2 footprint in the office
- Improve the work environment by adjusting the temperature, light intensity, etc., to individual preferences and business processes
- Increase the productivity of work



Technology used:

- Ami-IoT: based on LinkSmart middleware, http://sourceforge.net/projects/linksmart/, using outcomes of the FP7 project ebbits, http://www.ebbits-project.eu
- Semantics: device ontology, fusion of sensor-generated events, business rules
- Devices: energy consumption, environment conditions, and occupancy sensors - Plugwise, Arduino, Modbus

Application partner:

- RWE IT Slovakia, s.r.o., http://www. rweit-slovakia.com
- open space office room (administration department), 8 employees
- central heating, air conditioning, workstations/notebooks, printers, scanner, copier

InterSoft, a.s.
Košice, Slovakia

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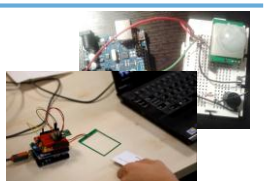
Living Lab scenarios

Scenario #1: *Exploration of a suitable occupancy sensing device*

- Examining different types of presence/occupancy sensors
- Goal: To find the most suitable toolkit for occupancy sensing
- Focus: To find a balance between (1) comfortable environment, (2) amount of saved energy / CO2 emissions, and (3) privacy loss

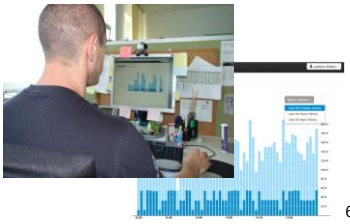


Scenario #2: *Process-based adaptation of the working environment*

- Settings of work environment based on process model templates - predefined working hours, planning of absences, business trips, etc.
- Goal: To provide an adaptable process model of the working environment, which functionally complements the Smart Office IoT application
- Focus: Experiment with adaptations of the working environment according to process model templates and user's preferences

Scenario #3: *Competition on energy savings*

- A visualization showing actual/historical energy consumption and CO2 footprint data
- Goal: To enable users to play a “game” that helps and encourages energy savings
- Focus: To increase energy savings; to provide overviews and reports on energy savings for managers, decision makers



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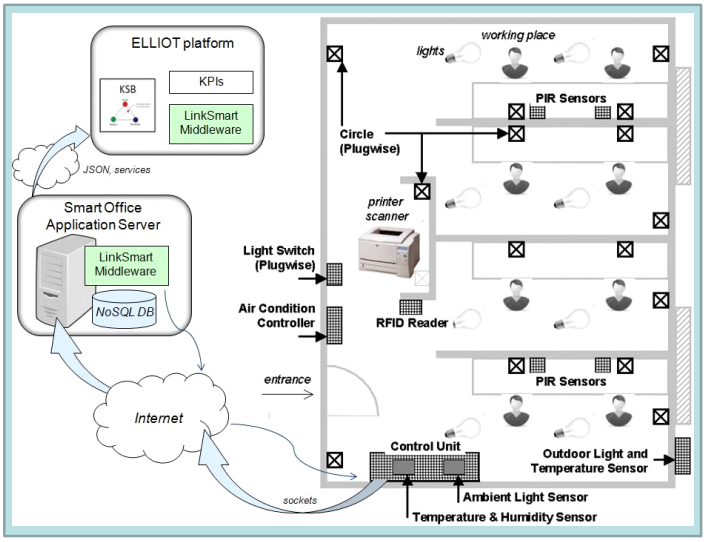
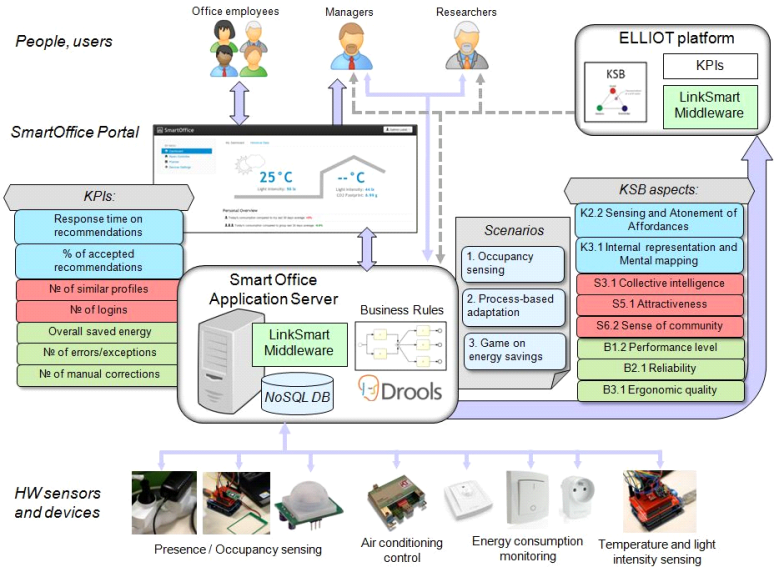
Distribution of sensors in the office



Services provided thanks to ELLIOT

	Monitored KSB characteristics	Improved by ELLIOT: Occupancy sensing	Improved by ELLIOT: Energy consumption monitoring	Newly developed thanks to ELLIOT: Adaptation to business processes	Newly developed thanks to ELLIOT: Adaptation to individual user preferences	Newly developed thanks to ELLIOT: Game/competition on energy savings	Newly developed thanks to ELLIOT: The Smart Office portal
		Services					
K	Reaction on recommendations for energy savings		X			X	X
K	Percentage of accepted recommendations on saving energy		X		X	X	X
S	Percentage of similar user profiles / preferences			X	X	X	X
S	No. of login records	X			X	X	X
B	Overall amount of saved energy		X	X		X	
B	No. of errors / exceptions in system logs	X		X			X
B	No. of manual corrections	X	X	X	X		

KPI - KSB evaluation



InterSoft, a.s
Košice, Slovakia

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Outcomes and lessons learnt

Benefits - success factors:

- Precise/accurate sensing of presence of persons on a given (working) place, which can be beneficial as a service in emergency situations
- Awareness of actual/historical energy consumption and CO2 footprint of the office
- Availability of various customisable reports on energy consumption
- Recommendations on adjusting the office room temperature, light intensity, etc., generated by the service for particular employees, may lead to energy savings
- Work environment in the office adapted to business processes and/or to working schedules of employees or project teams

Challenges:

- To find a proper combination of KPI-KSB parameters – bottom-up and top-down approaches can be combined (i.e., sensors: what can be monitored vs. high-level requirements: what should be measured and evaluated)
- Customisation of the solution to other types of offices – scalability, use of open and standardised interfaces to include custom sensors, devices, or data sources

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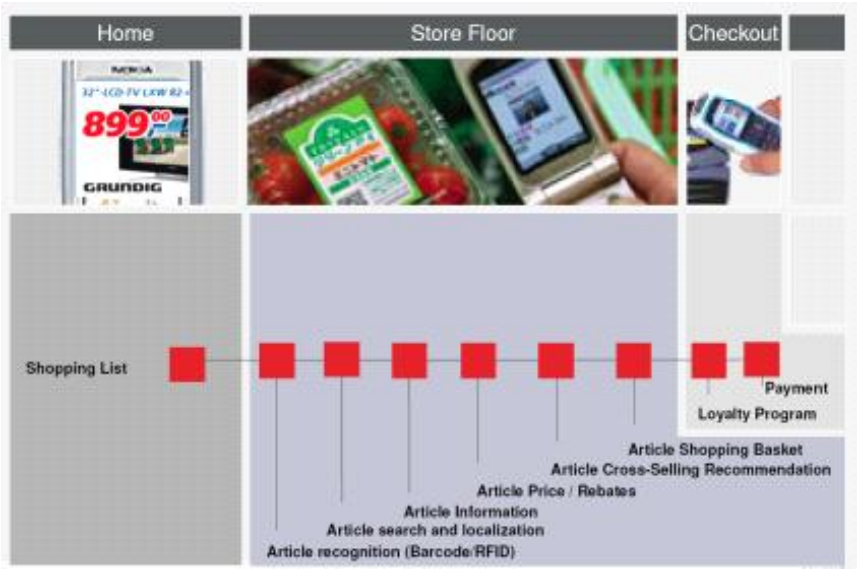
The retail concept



- Over 400 users
- 1 week (February 25- March 3)

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The retail use-case

- Sign-in with loyalty card
- Receive loyalty status info
- Receive advertisement
- Retrieve shopping list
- Read product
- Retrieve product information
- Get location info
- Receive product recommendations
- Collect coupons
- Transfer coupons
- Share experience – Web2
- Redeem coupons
- Make payment
- Exit through security

Services developed thanks to ELLIOT

Services developed thanks to ELLIOT

- **K Services**
  - Push coupon
  - Recommendation in shopping list and queries
  - Introduction of transaction logging
- **S Services**
  - Sign in to Facebook

Services Improved thanks to ELLIOT

- **K Services**
  - Renewed help function
    - Built into background – always on
  - Coupon redemption
    - Showing details before acceptance
  - Product recommendations
    - Personalized offers
  - Transaction logging
    - Content and analysis
- **S Services**
  - Input of additional personal info
    - In addition to sharing photo

Characterisation of users involvement

- **How users were involved**
  - Real shoppers – invitation and motivation
- **Categories of users**
  - Customers and merchants
  - No further differentiation but we know lots of details of them
    - Age, sex, type of phone used
- **Feedback from the users**
  - Assessment of functions
  - Critics
  - Recommendations

Lessons Learnt

- **Success factors**
  - Real benefits
    - Usability
    - Monetary
  - Proper execution
    - Accessibility
    - Design
- **Challenges**
  - Finding the right mix
    - Enough value add but not overcomplicated

ELLIOT Results

User Experience Based Design Research Roadmap

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ELLIOT Roadmap

Elliot's ambition is to initiate and lead the development and implementation of the "User Experience Based Design" in IoT related industrial contexts.

The ELLIOT overall vision is that competitive edge for Industry in the next 10 years at least will derive from the ability to capture and analyse the User Experience and to integrate it in the new product/service development life cycle.

In spite of the contribution provided by ELLIOT, there are still a number of unanswered issues which have to be addressed to support the above explained vision.

The objective of the ELLIOT Roadmap is to provide concrete research and implementation suggestions in order to overcome the gaps still existing and to facilitate the fully uptake of the UX in the IoT domain.

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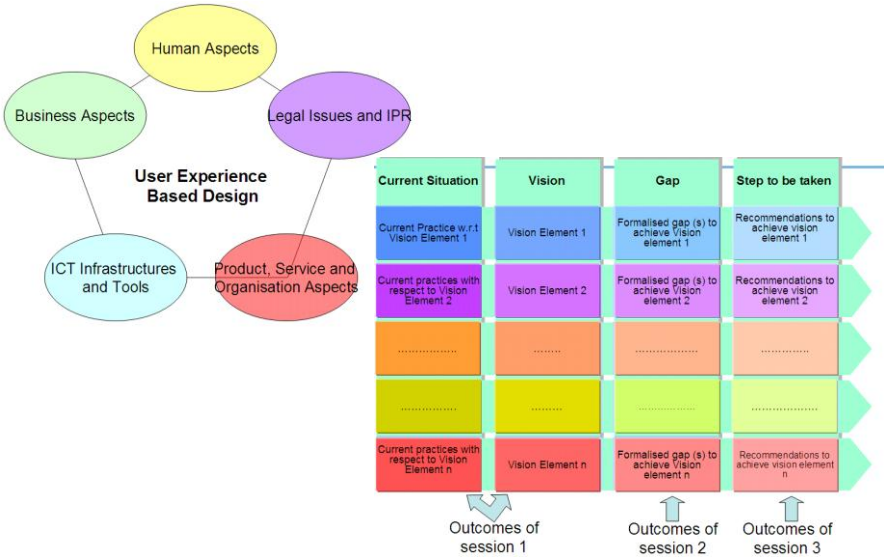
The ELLIOT Roadmapping Process

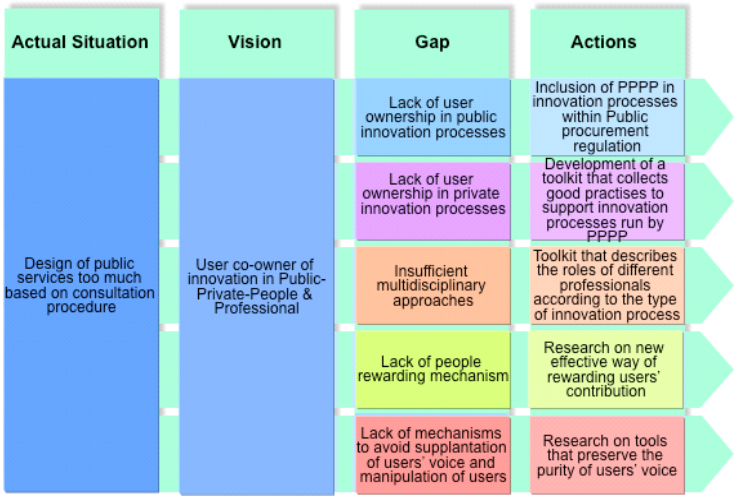


ELLIOT Roadmap – The process

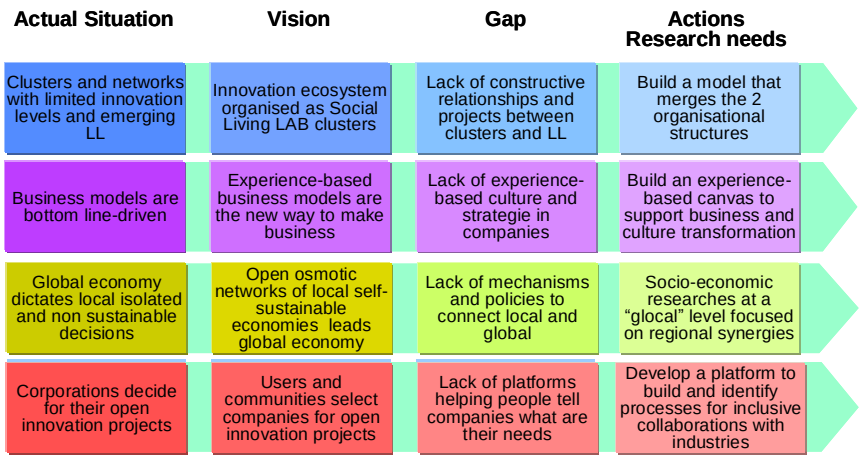
The roadmap is based on the following logical steps:

- The first step is devoted to the analysis of the current situation, in order to derive a shared status of the current consolidated achievements
- The second step is devoted to devise the vision of UX design for each of the five topic areas, starting from the state of the art, as identified from the discussions and the work reported. The vision we are looking for is the ideal scenario towards which the audience expects to go. From the vision scenario, vision elements will be derived and prioritised.
- The third step is devoted to the identification of gaps (associated to each vision element) between current situation and practices and the vision scenario.
- The fourth step is devoted to the identification of short, medium and long term actions needed to address the identified gaps.

Human Aspects Area



Business Area



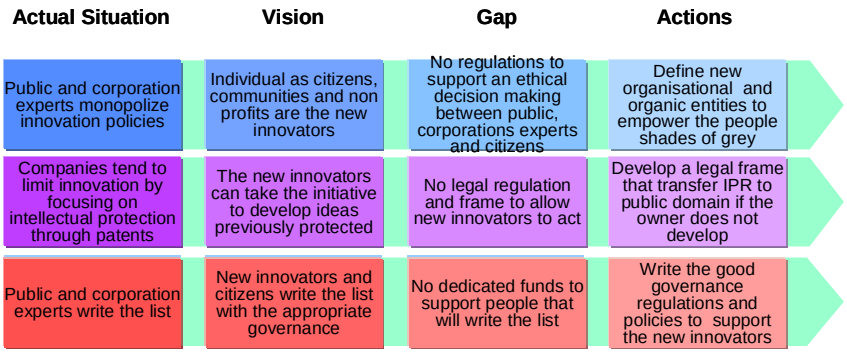
Product-Service-Organisation Area

Actual Situation	Vision	Gap	Actions
Increase of complexity when considering concurrently PSO. Difficulties to anticipate UX	Ability to anticipate the User Experience within the complexity of PSO design	Lack of immersive/usage methods, techniques & tools	Explore with users potential immersive environments in a systematic way
Too much short term driven design	Designing for consuming less resources in a more medium-long term sustainable way	Lack of simulation of cumulative UX on medium-long term	R&D on cumulative UX simulators for specific sectors (e.g. health & environment)
Downstream organisation-operations are often not so value creating	Engage users in the organisation design to create more value	Lack of user engagement in the design of downstream organisation-operations	Create a change mgmt approach to embed UX feed-forward in companies organisation design
Value often decrease when facing unplanned situation	"On the fly" user customisation for solving unplanned situation	Lack of process flexibility and adaptability of the UX	Create dynamic service recovery approaches
Little concern on design for social respectfulness	Balance profit maximisation with responsible economic development	Lack of responsible PSO design	Create a framework for issuing experience based ethical regulation

ICT Area

Actual Situation	Vision	Gap	Actions
Open data	Open experience: replicability, aggregation, marketplace, connectivity	Tools to assign meaning to aggregate & to evaluate the relevance of the experience	Develop organic frame to condensate the appropriated data to form the experience
Passive environment	Smart environment: active, intuitive, adaptive, on fast network	Context data not comparable in pull	Tool to extract micro-exp reusable
Simulation	3D immersive AR	Ability to connect sensors to the experience (profile)	Develop exp profile and correlation model
Too much push model	Push model: adaptive, evolutive, reactive	Devices not adaptive (e.g. sofa, t-shirt)	Device adapt itself to the exp profile according to the context
Smart sensors	Personalised actuation (e.g. off button)	Lack of experience tool to help designers, lack of of 3D simulation of experienced based avatars	Develop computer aided experience design based on comparable context, experience profile

Ethics & Policies Area



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